

REMARKS

Applicants will address each of the Examiner's objections and rejections in the order in which they appear in the Office Action.

Specification

The Examiner objects to the specification and is requesting that "film 114" on page 17, ln. 11 be changed to -- film 115 -- . Applicants have now done so and request that this objection be withdrawn.

Claim Objections

The Examiner also objects to Claim 3 as being informal. In particular, the Examiner suggests that the term "insulating layer" in Claim 3 be changed to -- an insulating layer -- . Applicants have now done so and request that this objection be withdrawn.

Claim Rejections - 35 USC §103

The Examiner also rejects Claims 3, 6, 9 and 12 under 35 USC §103 as being unpatentable over Lee et al. in view of Kim. This rejection is respectfully traversed.

The present invention is directed to a semiconductor device. The structure of the claimed device is such that a reduction in manufacturing costs and an improvement in yield results because the number of steps needed to produce the device is reduced. More specifically, the device as recited in amended independent Claim 3 has an input terminal portion comprised of "a first layer

comprising the same material as that of the gate electrode and a second layer comprising the same material as that of the pixel electrode in contact with the first layer through a *contact hole formed in the insulating layer*.” (emphasis added) This is shown in the specification and drawings at, for example, Figs. 3A-4B and pages 21-22 wherein first layer 204 in the input terminal portion is made of the same material as gate electrode 202; a contact hole 217 is formed in insulating layer 205; and a second layer 208 of the same material as pixel electrode 207 is formed in the contact hole 217 in contact with layer 204. As explained at pages 3-4, with such a structure, the number of photomasks used in the photolithography technique is reduced which results in reduced manufacturing costs and improved yield.

In contrast, the Examiner argues that Lee discloses a semiconductor device comprising an alleged input terminal portion including a first layer (24 and 22) comprised of the same materials as the gate electrode (24 and 22) and a second layer (36a) comprised of the same material as the pixel electrode. However, this area in Lee, as shown in Fig. 11, has a gate pad portion 22, 24 (see col. 4, lns. 55-65) and pixel electrode 36a in contact with the gate pad 24 through a *contact hole formed in an insulating film 26 and a protection film 34*. Hence, this is clearly different than the structure of the claimed invention and requires more steps to produce.

As Kim does not disclose the structure of the input terminal portion , it is respectfully submitted that the references do not disclose or suggest the claimed invention, and the claims are patentable thereover. Accordingly, it is requested that the rejection be withdrawn.

New Claims

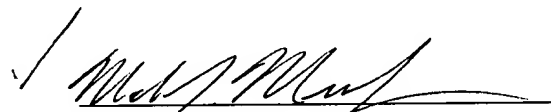
Applicants are also adding new Claims 25-30 herewith. It is believed that each of these claims is also allowable.

As Applicants previously paid for 24 claims and 6 independent claims and now has only 10 claims and 7 independent claims, a check for the extra independent claim of \$84 is included herewith. If any further fee is due for the claims or this amendment, please charge our Deposit Account No. 50-1039.

Favorable reconsideration is earnestly solicited.

Respectfully submitted,

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Marked-up copy of the amendments made herein:

IN THE SPECIFICATION:

Please amend the paragraph at page 17, lns. 13-19 as follows:

Since the second insulating film [114] 115 is made of the organic insulating material, the surface can be excellently flattened. Also, since the organic resin material is generally low in permittivity, a parasitic capacitor can be reduced. However, since the organic resin material has the hygroscopic property and is not proper for a protective film, it is preferable that the second interlayer insulating film 115 is combined with the silicon oxide film, the silicon nitrogen oxide film, the silicon nitride film or the like formed as the first interlayer insulating film 114 as in this embodiment.

IN THE CLAIMS:

Please amend the claims as follows:

Cancel Claims 1 and 2.

3. (Twice Amended) A semiconductor device comprising:

a substrate having an insulating surface;

a thin film transistor formed over the substrate, the thin-film transistor comprising a gate electrode formed over the substrate; [and] an insulating layer formed on the gate electrode; a channel formation region formed in a semiconductor layer having an amorphous structure; source and drain regions, each of the source and drain regions comprising a semiconductor layer including one-conductive type impurity elements, formed over the semiconductor layer having the amorphous structure;

an interlayer insulating layer comprising an inorganic material and formed on the semiconductor layer having the amorphous structure and the semiconductor layer containing the one-conductive type impurity elements so as to be in contact with at least a part of the channel formation region;

a pixel electrode formed in contact with the insulating layer; and

an input terminal portion formed along an end portion of the substrate and electrically connected to a wiring [of another substrate];

wherein the input terminal portion [includes a first layer comprising the same material as that of the gate electrode and a second layer comprising the same material as that of the pixel electrode.]
comprises a first layer comprising the same material as that of the gate electrode and a second layer comprising the same material as that of the pixel electrode in contact with the first layer through a contact hole formed in the insulating layer.

Cancel Claims 4 and 5.

6. A semiconductor device as claimed in claim 3, wherein the gate electrode is comprising a heat-resistant electrically conductive material, or the heat-resistant electrically conductive material and a low-resistive electrically conductive material.

Cancel Claims 7 and 8.

9. A semiconductor device as claimed in claim 6, wherein the heat-resistant electrically conductive material is comprising an element selected from titanium (Ti), tantalum (Ta) or tungsten

(W), a compound that contains any one of the above elements, a compound film that combines the above elements together, or a nitride that contains any one of the above elements; and

wherein the low-resistive electrically conductive material is comprising a material containing aluminum (Al).

Cancel Claims 10 and 11.

12. A semiconductor device as claimed in claim 3, wherein the semiconductor device comprises one of a personal computer, a video camera, a portable information terminal, a digital camera, a digital video disc player, an electronic play device and a television.

Cancel Claims 13-24.

Please add the following new claims:

25. (New) A semiconductor device comprising:

a substrate having an insulating surface;

a thin film transistor formed over the substrate, the thin-film transistor comprising a gate electrode formed over the substrate; an insulating layer formed on the gate electrode; a channel formation region formed in a semiconductor layer having an amorphous structure; source and drain regions, each of the source and drain regions comprising a semiconductor layer including one-conductive type impurity elements, formed over the semiconductor layer having the amorphous structure;

an interlayer insulating layer comprising an inorganic material and formed on the semiconductor layer having the amorphous structure and the semiconductor layer containing the

one-conductive type impurity elements so as to be in contact with at least a part of the channel formation region;

a pixel electrode formed in contact with the insulating layer; and

an input terminal portion formed along an end portion of the substrate and electrically connected to a wiring;

wherein the input terminal portion includes a first layer comprising the same material as that of the gate electrode and a second layer comprising the same material as that of the pixel electrode, and

wherein each of the gate electrode and the first layer has a tapered portion formed on at least an end portion thereof.

26. (New) A semiconductor device comprising:

a substrate having an insulating surface;

a thin film transistor formed over the substrate, the thin-film transistor comprising a gate electrode formed over the substrate; an insulating layer formed on the gate electrode; a channel formation region formed in a semiconductor layer having an amorphous structure; source and drain regions, each of the source and drain regions comprising a semiconductor layer including one-conductive type impurity elements, formed over the semiconductor layer having the amorphous structure;

an interlayer insulating layer comprising an inorganic material and formed on the semiconductor layer having the amorphous structure and the semiconductor layer containing the one-conductive type impurity elements so as to be in contact with at least a part of the channel formation region;

a pixel electrode formed in contact with the insulating layer;

a storage capacitor comprising a storage capacitor wiring comprising the same material as that of the gate electrode, the insulating layer on the storage capacitor wiring and the pixel electrode on the insulating layer; and

an input terminal portion formed along an end portion of the substrate and electrically connected to a wiring;

wherein the input terminal portion includes a first layer comprising the same material as that of the gate electrode and a second layer comprising the same material as that of the pixel electrode.

27. (New) A semiconductor device comprising:

a substrate having an insulating surface;

a thin film transistor formed over the substrate, the thin-film transistor comprising a gate electrode formed over the substrate; an insulating layer formed on the gate electrode; a channel formation region formed in a semiconductor layer having an amorphous structure; source and drain regions, each of the source and drain regions comprising a semiconductor layer including one-conductive type impurity elements, formed over the semiconductor layer having the amorphous structure;

an interlayer insulating layer comprising an inorganic material and formed on the semiconductor layer having the amorphous structure and the semiconductor layer containing the one-conductive type impurity elements so as to be in contact with at least a part of the channel formation region;

a pixel electrode formed in contact with the insulating layer;

a storage capacitor comprising a storage capacitor wiring comprising the same material as

that of the gate electrode, the insulating layer on the storage capacitor wiring and the pixel electrode on the insulating layer; and

an input terminal portion formed along an end portion of the substrate and electrically connected to a wiring;

wherein the input terminal portion comprises a first layer comprising the same material as that of the gate electrode and a second layer comprising the same material as that of the pixel electrode in contact with the first layer through a contact hole formed in the insulating layer.

28. (New) A semiconductor device comprising:

a substrate having an insulating surface;

a thin film transistor formed over the substrate, the thin-film transistor comprising a gate electrode formed over the substrate; an insulating layer formed on the gate electrode; a channel formation region formed in a semiconductor layer having an amorphous structure; source and drain regions, each of the source and drain regions comprising a semiconductor layer including one-conductive type impurity elements, formed over the semiconductor layer having the amorphous structure;

an interlayer insulating layer comprising an inorganic material and formed on the semiconductor layer having the amorphous structure and the semiconductor layer containing the one-conductive type impurity elements so as to be in contact with at least a part of the channel formation region;

a pixel electrode formed in contact with the insulating layer;

a storage capacitor comprising a storage capacitor wiring comprising the same material as that of the gate electrode, the insulating layer on the storage capacitor wiring and the pixel electrode

on the insulating layer; and

an input terminal portion formed along an end portion of the substrate and electrically connected to a wiring;

wherein the input terminal portion includes a first layer comprising the same material as that of the gate electrode and a second layer comprising the same material as that of the pixel electrode, and

wherein each of the gate electrode, the storage capacitor wiring and the first layer has a tapered portion formed on at least an end portion thereof.

29. (New) A semiconductor device comprising:

a substrate having an insulating surface;

a thin film transistor formed over the substrate, the thin-film transistor comprising a gate electrode formed over the substrate; an insulating layer formed on the gate electrode; a channel formation region formed in a semiconductor layer having an amorphous structure; source and drain regions, each of the source and drain regions comprising a semiconductor layer including one-conductive type impurity elements, formed over the semiconductor layer having the amorphous structure;

an interlayer insulating layer comprising an inorganic material and formed on the semiconductor layer having the amorphous structure and the semiconductor layer containing the one-conductive type impurity elements so as to be in contact with at least a part of the channel formation region;

a pixel electrode formed in contact with the insulating layer; and

an input terminal portion formed along an end portion of the substrate and electrically connected to a wiring;

wherein the input terminal portion comprises a first layer comprising the same material as that of the gate electrode and a second layer comprising the same material as that of the pixel electrode in contact with the first layer through a contact hole formed in the insulating layer, and

wherein each of the gate electrode and the first layer has a tapered portion formed on at least an end portion thereof.

30. (New) A semiconductor device comprising:

a substrate having an insulating surface;

a thin film transistor formed over the substrate, the thin-film transistor comprising a gate electrode formed over the substrate; an insulating layer formed on the gate electrode; a channel formation region formed in a semiconductor layer having an amorphous structure; source and drain regions, each of the source and drain regions comprising a semiconductor layer including one-conductive type impurity elements, formed over the semiconductor layer having the amorphous structure;

an interlayer insulating layer comprising an inorganic material and formed on the semiconductor layer having the amorphous structure and the semiconductor layer containing the one-conductive type impurity elements so as to be in contact with at least a part of the channel formation region;

a pixel electrode formed in contact with the insulating layer;

a storage capacitor comprising a storage capacitor wiring comprising the same material as that of the gate electrode, the insulating layer on the storage capacitor wiring and the pixel electrode on the insulating layer; and

an input terminal portion formed along an end portion of the substrate and electrically connected to a wiring;

wherein the input terminal portion comprises a first layer comprising the same material as that of the gate electrode and a second layer comprising the same material as that of the pixel electrode in contact with the first layer through a contact hole formed in the insulating layer, and

wherein each of the gate electrode, the storage capacitor wiring and the first layer has a tapered portion formed on at least an end portion thereof.